

REMARKS

Claims 1, 4-8, 10, 13-19, 22-28, 36, 38, 39, and 43-46 are pending in the application with claims 1, 10, 18, 38, and 43 amended herein and new claims 45 and 46 added herein.

Claims 18, 19, 38, 39, 43, and 44 stand rejected under 35 USC 112, first paragraph, as lacking a description in the specification. Applicants request reconsideration.

The Office alleges that the upper claim limit of "less than 630° C" does not appear to have a specific description in the specification. However, the Office acknowledges that the specification discloses a temperature of from about 400° C to about 700° C or preferably about 500° C, but considers 630° C as newly added.

The Federal Circuit has clearly established that compliance with the written description requirement "must be determined on a case-by-case basis" and has soundly rejected the proposition "that ranges found in the applicant's claimed language must correspond exactly to ranges disclosed" in the application. Ralston Purina Co. v. Far-Mar-Co., Inc., 772 F.2d 1570, 227 USPQ 177, 179 (Fed. Cir. 1985). Rather, the sole question here is whether one of skill in the art could derive the claim limitations from the disclosure of the application. The Court acknowledged that certain factors may exist that could preclude one of skill in the art from deriving the claim limitation from the application. Id. However, the Office has not alleged that any such factors exist precluding one of ordinary skill from deriving the claimed temperature range with an upper limit of less than 630° C from the disclosed broader range of from about 400° C to about 700° C.

The Office has merely alleged that 630° C is not specifically indicated without any support whatever for the bare allegation. Under the current law in the present

circumstances, a bare allegation is insufficient to establish lack of compliance with the description requirement. Since the present rejection is inadequate, it should be withdrawn absent a proper explanation of why one of skill in the art could not derive the claimed range from the application even though it is entirely subsumed within the expressly disclosed range of from about 400° C to about 700° C.

Under similar facts, the Applicants note that the Federal Circuit found that a disclosed range of 212° F to 380° F provided a proper written description of a range of 212° F to 310° F despite lack of any specific indication of 310° F. Ralston Purina Co. v. Far-Mar-Co., Inc., 586 F. Supp. 1176, 222 USPQ 863, 885-886 (D. Kan. 1984), aff'd in part and rev'd in part, 772 F.2d 1570, 227 USPQ 177, 179 (Fed. Cir. 1985). The Court found that the claimed range merely involved "claiming a portion of that which had been earlier described." Id. Accordingly, the Office's persistence in maintaining the present rejection without proper support, as discussed above, is clearly contrary to the established law. Applicants request withdrawal of such rejection in the next Office Action.

The amendments of August 29, 2000 and June 25, 2001 are objected to under 35 USC 132 as allegedly introducing new matter into the disclosure. Since the disclosure provides a proper written description of the claim limitations introduced in the indicated amendments, the amended subject matter is not new matter. Applicants are thus not required to cancel the new matter in the reply to the Office Action.

Claims 1, 4-7, 10, 16, 17 and 36 stand rejected under 35 USC 103(a) as being unpatentable over Vassiliev. Applicants request reconsideration.

Claims 18, 19, 38, 39, 43 and 44 stand rejected under 35 USC 103(a) as being unpatentable over Vassiliev. Applicants further request reconsideration.

Amended claim 1 sets forth a method of forming a fluorine doped insulating material that includes, among other features, depositing the insulating material using ozone with a plasma being present within the chamber. Amended claim 18 sets forth a method of forming a silicon oxide having Si-F bond that includes, among other features, providing a plasma within a reaction chamber while providing an ozone containing reactant and a precursor. Page 9 of the Office Action alleges that Vassiliev "explicitly" discloses processing insulating material in the presence of plasma with a statement of that "methods such as plasma enhanced deposition must not be incorporated even though they may offer some short term advantages such as higher deposition rates," as stated in column 6, lines 4-7. Applicants note that the quoted text of Vassiliev merely states that plasma "may" offer higher rates and does not state that plasma will offer higher rates. The most that can be said about the statement is that some expectation exists of higher rates, but that it will not necessarily result.

Further, Vassiliev refers to Fig. 2 as an actual example of deposition using plasma enhanced CVD, but does not give any indication that the deposition used ozone. In contrast, Fig. 3 is also described as an actual example of successful deposition and specifically mentions using ozone. One of ordinary skill would deduce from the teachings of Vassiliev that if ozone was used to form the material of Fig. 2, then specific mention would be made of using ozone. No such teaching is found in Vassiliev.

Essentially, the Office asserts that even though Vassiliev expressly teaches against using plasma and ozone in a deposition process, such deposition was actually performed to discover the disclosed disadvantage. However, Vassiliev merely states with some uncertainty that using plasma "may offer" higher rates. Also, Vassiliev merely gives an example in Fig. 2 of oxide layer 24 deposited using plasma enhanced CVD without mention of whether ozone was used. That is, Vassiliev cannot be considered to expressly disclose plasma deposition using ozone. Rather, the most that the Office can reasonably allege is that Vassiliev inherently discloses plasma deposition using ozone. Even such an allegation is improper in view of the legal requirements to establish inherency discussed below.

"The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citations omitted) (emphasis in original); MPEP § 2112. Further, "[i]n relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis added); MPEP § 2112. The Office Action does not provide adequate support that deposition using plasma and ozone necessarily flows from the alleged teachings of Vassiliev. It is just as likely that Vassiliev did not actually perform plasma deposition using ozone.

Fig. 2 of Vassiliev is merely described as deposited using plasma enhanced CVD without any mention of using ozone. Also, all Vassiliev says about plasma deposition is that it "may offer" higher rates. Vassiliev is thus uncertain whether plasma deposition using

ozone will actually yield higher rates. Applicants assert that all the statements of column 6, lines 1-14 in Vassiliev can be established from test results merely using plasma enhanced CVD, as expressly stated, without also using ozone. The teaching of using plasma and ozone thus does not necessarily flow from the express teachings of Vassiliev and such reference cannot be considered to inherently disclose the alleged subject matter.

The Office is reminded that this is not a circumstance where an express suggestion exists to perform the claimed deposition. Rather, the present circumstance involves an express teaching against a deposition process using plasma and ozone. The Office has attempted to turn the express teaching against the deposition into an inherent teaching of actually performing the deposition to arrive at the knowledge that plasma deposition with ozone is not desired. However, as stated above, one of ordinary skill would not find that the allegedly inherent teaching necessarily flows from the statements in Vassiliev. The mere fact that the allegedly inherent teaching might result from the statements in Vassiliev is not sufficient to establish inherency.

Nowhere within the text of Vassiliev does such reference actually state that Fig. 2 shows an oxide layer deposited using plasma and ozone. Also, Vassiliev does not actually state that deposition was performed using plasma and ozone to learn that plasma enhanced deposition must not be incorporated into the Vassiliev process. Any assertion that Vassiliev teaches using plasma and ozone must be considered an assertion of an inherent teaching, rather than an express teaching. Even so, for the purposes of 35 USC 103, such an assertion of an inherent teaching is legally insufficient to establish disclosure or suggestion of every element of claims 1 and 18.

Specifically, Vassiliev does not disclose or suggest providing reactants including silicon, fluorine, and ozone within a reaction chamber and depositing an insulating material with a plasma being present in the reaction chamber, as set forth in claim 1. Also, Vassiliev does not disclose or suggest providing an ozone containing reactant and a precursor within a reaction chamber, providing a plasma within the reaction chamber, and depositing a silicon oxide, as set forth in claim 18. Accordingly, claims 1 and 18 are patentable over Vassiliev. Claims 4-7, 10, 16, 17, and 36 depend from claim 1 and are patentable over Vassiliev at least for such reason as well as the additional limitations of such claims not disclosed or suggested. Claims 19, 38, 39, 43, and 44 depend from claim 18 and are patentable at least for such reason as well as the additional limitations of such claims not disclosed or suggested. Accordingly, Applicants request allowance of claims 1, 4-7, 10, 16, 18, 19, 36, 38, 39, 43, and 44 in the next Office Action.

Claim 8 stands rejected under 35 USC 103(a) as being unpatentable over Vassiliev in view of Homma. Applicants request reconsideration.

Claim 8 depends from claim 1 and sets forth that the fluorine in the insulating material is present at a concentration of from about 0.1 atomic percent to about 10 atomic percent. Page 5 of the Office Action acknowledges that Vassiliev does not disclose the concentration range and relies upon Homma as allegedly teaching such features. However, Homma does not remedy and is not alleged to remedy the deficiencies of Vassiliev discussed above. Accordingly, claim 8 is patentable over Vassiliev in view of Homma and Applicants request allowance in the next Office Action.

Claims 13-15 and 22-28 stand rejected under 35 USC 103(a) as being unpatentable over Vassiliev in view of Kirchhoff. Applicants request reconsideration.

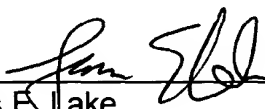
Claims 13-15 and 22-28 depend from claim 1 the subject matter of which is discussed above. Pages 5-6 of the Office Action acknowledge that Vassiliev does not teach including boron and/or phosphorous in the reactants and relies on Kirchhoff as allegedly providing such disclosure. However, Kirchhoff does not remedy and is not alleged to remedy the deficiencies of Vassiliev discussed above with regard to claim 1. Accordingly, claims 13-15 and 22-28 are patentable over Vassiliev in view of Kirchhoff and Applicants request allowance in the next Office Action.

New claims 45 and 46 are added herein including limitations that will be appreciated from the above discussion as rendering such claims patentable over the currently cited art. Accordingly, Applicants request allowance of claims 45 and 46 in the next Office Action.

Applicants herein provide adequate reasons for allowance of claims 1, 4-8, 10, 13-19, 22-28, 36, 38, 39, and 43-46 and request that all of such pending claims be allowed in the next Office Action.

Respectfully submitted,

Dated: 25 Jun 2002

By: 
James E. Lake
Reg. No. 44,854



RECEIVED
JUL -2 2002
TC 2800 MAIL ROOM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No.09/146,839
Filing Date September 3, 1998
Inventor Anand Srinivasan et al.
Assignee Micron Technology, Inc.
Group Art Unit 2814
Examiner A. Mai
Attorney's Docket No. MI22-1017
Title: Methods of Forming Fluorine Doped Insulating Materials

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
PRELIMINARY AMENDMENT TO ACCOMPANY RCE

In the Claims

The claims have been amended as follows. Underlines indicate insertions and
~~strikeouts~~ indicate deletions.

1. (amended) A method of forming a fluorine doped insulating material comprising:
providing a substrate within a reaction chamber, the reaction chamber controlled
within a range of temperatures from above 400 degrees Celsius ($^{\circ}\text{C}$) but not greater
than about 700°C ;

providing reactants comprising silicon, fluorine and ozone within the reaction
chamber and maintaining a pressure within the reaction chamber of from about 400
Torr to about 1 atmosphere; and

depositing an insulating material, at a rate of from about 1000 angstroms per
minute ($\text{\AA}/\text{min}$) to about 10000 $\text{\AA}/\text{min}$, comprising fluorine, silicon and oxygen onto the

substrate from the reactants, wherein the depositing occurs with a plasma being present in the reaction chamber.

10. (amended) The method of claim 1 ~~further~~ comprising maintaining a pressure within the reaction chamber at ~~from about 1~~ 600 Torr ~~to about 1 atmosphere~~ during the depositing.

18. (twice amended) A method of forming a silicon oxide having Si-F bonds, comprising:

providing a reaction chamber at a temperature in excess of 400 degrees Celsius (°C) but less than 630°C;

positioning a substrate within the reaction chamber;

providing an ozone comprising reactant and a precursor having Si-F bonds to the substrate within the reaction chamber and maintaining a pressure within the reaction chamber of from about 400 Torr to about 1 atmosphere;

while providing the ozone comprising reactant and the precursor having Si-F bonds to the substrate, providing a plasma within the reaction chamber; and

causing a silicon oxide having Si-F bonds, to deposit onto the substrate within the reaction chamber at a rate of from about 1000 angstroms per minute (Å/min) to about 10000 Å/min.

38. (amended) The method of claim 18 comprising maintaining ~~a pressure and a~~ temperature within the reaction chamber ~~at from about 400 Torr to about 1 atmosphere~~ and in excess of 500°C but less than 630°C, ~~respectively~~, during the depositing.

43. (amended) The method of claim 18 comprising maintaining ~~a pressure and a~~ temperature within the reaction chamber ~~at from about 400 Torr to about 1 atmosphere~~ and from about 500°C to about but less than 630°C, ~~respectively~~, during the depositing.

-END OF DOCUMENT-